.002 - .2 in (.05-5mm) of material selected from the group consisting of:

(a) alloys comprising a metal selected from the class consisting of nickel and reactive metals (titanium, niobium, tantalum, zirconium and/or hafnium) as a principal alloy ingredient and one or more additional alloy ingredients selected from the class consisting of aluminum, vanadium, nickel, iron, copper and niobium,

(b) nickel aluminide and titanium aluminide, and

(c) one or more of the elements, titanium, zirconium, hafnium

comprising steps of:

(1) forming a tubular blank of the metal assembled into an assembly with a metal core surrounded and contacted by the tubular blank, the core metal being capable of stable elongation - elongation with uniform reduction of cross section area in relation to the degree of elongation - with a greater degree of reduction than the tube blank or the same degree of reduction depending on applied conditions, the metal of the core having an elongation capability as described at (3) below when worked as described in (2) and (3), below,

(2) elongating the assembly by mechanical working until the tube is reduced in cross section area outer diameter compared to the original billet assembly and the tube wall thickness is correspondingly reduced compared to the original tubular blank, but in a way that avoids metallurgical or chemical bonding at the tubular blank/core interface, and then

(3) further elongating the core by mechanical working, but in a way that causes its elongation and corresponding cross area reduction to a greater degree than any concomitant elongation and cross section area reduction of the tube with such elongation/reduction retained when stretching forces are withdrawn so that a clearance is developed between the tube and core enabling longitudinal core removal, and then

(4) removing the core. --

Claims 2, 10 and 20 (amended), line 1, change "1" to -- 24 --

Claims 13, 16-19, 21 and 22, line 1, change "1" to -- 24 --

REMARKS

The art applied in the substantive Patent & Trademark Office actions of 20 Dec. 1995 and 23 Sept. 1996 comprises U.S. patents of Takamura et al. and Thiruvanrudchelvan and Ohashi et al., the French patent to Thomasson and an abstract of a Japanese patent to Furukawa Electric Co. Ltd. The following comments review this art, compare the same to the claims as now presented (and as previously presented before the above amendment), skill of the art, other pertinent factors and the ultimate findings re anticipation, obviousness and patentability.

The newly cited reference, French patent 980 957 granted in 1951 to Thomasson, has the basic mechanical working steps recited in claims 2-21 and 24, i.e. assembling a tube blank with a core, mechanical working reduction without bonding, further core elongation to enable longitudinal removal and then removal of the core. The materials recited in claims 2-21 and 24 are not provided and the results flowing from the claimed combination of working steps and materials are not achieved.

U.S. patent 4,186,586 granted in 1980 to Takamura et al./Nikon Gakki Seizo K.K. shows hydrostatic coextrusion of a metallic tube blank and metallic core separated by a solution-removable salt layer. After reduction, the salt layer defines an annular gap so that after dissolving the salt, the metallic core can be longitudinally withdrawn. The tube material is copper and the core is aluminum. It is disclosed that the process can also be extended to swaging and drawing.

U.S. patent 4,300,378 granted in 1991 to Thiruvanrudchelvan shows a standard process (then and now) of tube extrusion about a conical mandrel 106. There is no teaching of extended stretching/area reduction of a core compared to a surrounding tube and no teaching of the materials recited herein or any of the benefits of the presently claimed invention.

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